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Abstract

This study investigates the effect of workers' remittances on economic growth of five South Asian countries namely Pakistan, India, Bangladesh, Sri Lanka & Nepal by employing long time series data from 1975 to 2009. Cointegration results confirm that there exist significant positive long run relationship between remittances and economic growth in India, Bangladesh, Sri Lanka and Nepal while, significant negative relationship exist between remittances and economic growth in Pakistan. Causality analysis shows bidirectional causality between remittances and economic growth in Nepal and Sri Lanka. On the other hand, unidirectional causality exist, runs from remittances to economic growth in Pakistan, India and Bangladesh. Sensitivity analysis confirms that the results are robust. It suggested that policy makers should make policies to reduce the transaction cost to welcome remittances in the region. In addition, countries especially Pakistan should more relying on increasing exports rather than workers' remittances as foreign exchange earnings for sustainable and long run growth in the country.

Key words: Remittances, Economic Growth,

JEL Classification: F24, F43,

1. Introduction

South Asia has been an important source of migrant workers for countries suffering from labour shortages and migrant workers' remittances have become an increasingly important source of income for the region. Remittances sent by these migrant workers to their home countries have played an important role to promote economic development in these countries.¹ Remittance is different from other external capital inflow like foreign direct investment, foreign loans and aids due to its stable nature.² Similarly, remittances tend to go up when the recipient

¹ See, Siddique et al. (2010).

² Shahbaz and Aamir (2007).

economy suffers an economic recession as result of financial crisis, natural disasters, or political conflicts as migrants send more during hard time for helping their nations.³

Efficient amount of foreign exchange reserves is very much needed to pay the import bills and shortages of foreign exchange reserve is a main problem for developing countries. Remittances provide a main source for foreign exchange earnings in developing countries. Increases in the flows of remittances provide an opportunity to minimize the problem arising from shortages of foreign exchange reserves. There is a significant increase in inflows of remittances have been seen in South Asian countries in last two decades. The possible reason for such increase in amount of remittances may include the intensive increase in immigration of peoples from developing countries to developed countries in last two decades.⁴

Remittances are attractive source of foreign exchange earnings. However, very little attention has been paid in the empirical studies to analyze the relationship between workers' remittances on economic growth of South Asian countries. Most of the empirical studies use the cross sectional or panel data to analyze the impact of workers' remittances on economic growth⁵. Furthermore some time series empirical studies have also been conducted.⁶ Mostly empirical studies found the positive impact of workers' remittances on economic growth.⁷ Some empirical studies also found that remittances have negative impact on economic growth.⁸ But very few studies have been done on South Asian countries. The main purpose of this study is to reexamine the relationship between workers' remittances and economic growth by employing new long

³ Orozco (2003).

⁴ Source: World bank (World Development Indicators) 2007.

⁵ Faini (2006), Fayissa and Nsiah (2010), Chami et al. (2003), Mohammed (2009).

⁶ Ahmed et al. (2011), Karagoz (2009), Azam and Khan (2011) and Waheed and Aleem (2008).

⁷ Fayissa and Nsiah (2010), Faini (2006), Ahmed et al. (2011) and Azam and Khan (2011).

⁸ Waheed and Aleem (2008), Chami et al. (2003) and Karagoz (2009)

time series data of South Asian countries namely Pakistan, India, Bangladesh, Sri Lanka and Nepal.

The rest of paper is organized as follow: Section 2 reviews the empirical literature on the relationship between workers' remittances and economic growth. Section 3 discusses the modeling framework; section 4 shows empirical results, section 5 analyze the direction of causality between dependent and independent variables, Section 6 performs sensitivity analysis and the final section conclude the study and provide some policy implications.

2. Review of Literature

Chami *et al.* (2003) investigate the remittances as a source of capital development by using the panel data of 113 countries from the period of 1970 to 1998. Regression results indicate the negative and significant long run impact of workers' remittances on economic growth. They conclude that remittances do not act like as source of capital for economic development and there are significant obstacles to transfer these resources into significant source of capital.

Fayissa and Nsiah (2008) investigate the impact of remittances on economic growth by using the panel data over the period of 1980 to 2004 on 37 African countries. Regression results indicate the positive and significant relationship exist between remittances and economic growth. They conclude that remittances mainly boost the economic growth in financially less developed countries by providing an alternative way to finance investment and helping to overcome liquidity constraints.

Waheed and Aleem (2008) investigate the impact of workers' remittances on economic growth of by employing annual time series data of period from 1981 to 2006. They use cointegration and error correction model for long run and short run respectively. Sensitivity

analysis has also been done to check for the robustness of results. Results indicate the positive and significant relationship between workers' remittances and economic growth in short run. On the other hand significant negative long run relationship is found between workers' remittances and economic growth in long run.

Qayyum *et al.* (2008) empirically identify the impact of workers' remittances on economic growth and poverty reduction in Pakistan by using the ARDL approach on a sample of 1973 to 2007. Results indicate the positive and significant relationship of remittances with both economic growth and poverty reduction.

Karagoz (2009) investigates the long run impact of workers' remittances on economic growth in Turkey by using the cointegration technique on annual time series data of period from 1970 to 2005. Results indicate the significant negative impact of workers' remittances on economic growth of Turkey.

Mohammed (2009) investigates the impact of workers' remittances on economic growth in seven MENA countries by using the panel data regression technique over the period of 1975 to 2006.⁹ Results indicate the positive and significant relationship of remittances and economic growth in MENA countries.

Fayissa and Nsiah (2010) empirically examine the long run impact of workers' remittances on economic growth by using the panel data of 18 Latin American countries (LACs) from the period of 1980 to 2005.¹⁰ Regression results indicate the significant positive long run relationship exist between workers' remittances and economic growth. They concluded that remittances are another source of financial investment in less developing countries.

⁹ These countries were Algeria, Egypt, Jordan, Morocco, Syria, Tunisia and Sudan.

¹⁰ These countries were Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela RB.

Das and Chowdhury (2011) empirically examine the impact of workers' remittances on economic growth of 11 top remittances recipient developing countries by using the panel data from 1985 to 2009.¹¹ They used panel cointegration and pooled mean group approach. Results indicate the significant positive relationship exist between remittances and economic growth. They suggested that policy makers of developing countries should formulate policies to utilize the remittance resources into more productive sector.

Ahmed *et al.* (2011) empirically identify the long run and short run impact of workers' remittances on economic growth of Pakistan by using bound testing approach and error correction model on annual time series data from 1976 to 2009. Results indicate the significant positive relationship between workers' remittances and economic growth in Pakistan in both long run and short run.

Siddique *et al.* (2011) examine the causal relationship between workers' remittances and economic growth in South Asian countries.¹² They use annual time series data of period from 1976 to 2006. Granger causality test under the VAR framework has been used. Results indicate the no causal relationship workers' remittances and economic growth in India, unidirectional causality is found from workers' remittances to economic growth in Bangladesh and bidirectional causality is found between remittances and economic growth in Sri Lanka.

Yasmeen *et al.* (2011) investigate the impact of workers' remittances on total consumption and private investment of Pakistan by using the data from 1984 to 2009. Regression results indicate the significant positive relationship of workers' remittances with both private investment and total consumption. They recommended that developing countries may request to

¹¹ These countries were Bangladesh, Dominican Republic, El Salvador, Gambia, Guatemala, Honduras, Jamaica, Lesotho, Philippines, Senegal and Sri Lanka.

¹² These countries were India, Bangladesh and Sri Lanka.

developed countries to soft policies for work remittance in favor of their countries. This might boost total consumption and private investment which boost up their economy.

Azam and Khan (2011) investigates the relationship between workers' remittances and economic growth in Azerbaijan and Armenia by using the least square technique on annual time series data of period from 1995 to 2010. Results indicate the positive and significant relationship of workers' remittances with economic growth. They recommended that to formulate the appropriate conducive policies for the encouragement of workers' remittances.

3. Empirical Framework

After reviewing the theoretical and empirical studies, the model to examine the relationship between workers' remittances and economic growth is derived by using the production function framework. The general production function is:

$$Y = f(A, L, K) \quad (3.1)$$

Where Y is gross domestic production, L is total labor force and K is the stock of capital. The A captures the total factor productivity effect on output growth. It is assumed that workers' remittances (R) operates through A .¹³ The model is developed for empirical estimations as follows:

$$Y_t = \beta_0 + \beta_1 L_t + \beta_2 K_t + \beta_3 R_t + \varepsilon_t \quad (3.2)$$

Whereas ε_t is the error term. The positive sign is expected for L and K while, the sign of R is to be determined. Different annual time series data have been used for different countries.¹⁴ All data are gathered from the official database of World Bank. Data of capital stock is not

¹³ See, Kohpaiboon (2003), Waheed and Aleem (2008) and Jawaaid and Waheed (2011).

¹⁴ For Pakistan, India and Bangladesh are (1980 – 2009); for Sri Lanka (1985 – 2009) and for Nepal (1975 – 2005). It all depends on availability of data.

available so real gross fixed capital formation is used as a proxy of capital stock.¹⁵ All variables are used in logarithm form.

4. Estimations and Results

Augmented Dickey Fuller (*ADF*) and Phillip Perron (*PP*) unit root test are used to examine the stationary properties of long run relationship of time series variables. Table 4.1 represents the results of unit root test.

<Insert table 4.1 here>

Results of table 4.1 confirm the stationary of all variables at first difference of all countries. This means that the combination of one or more series may exhibit long run relationship.

<Insert table 4.2 here>

Results of table 4.2¹⁶ show significant positive long run relationships exist between workers' remittances and economic growth in India, Bangladesh, Sri Lanka and Nepal. The findings are consistent with past studies.¹⁷ The increase in remittances leads to increase in the purchasing power that will increase the total consumption of economy. The investment and production are also increase by the increases in the transferred amount of workers' remittances. The increases in consumption, investment and production are the major signs of economic development and all are increasing by the efficiently usage of workers' remittances.

On the other hand results also show the negative and significant long run relationship between workers' remittances and economic growth in Pakistan. The findings are consistent with

¹⁵ See Wong (2004).

¹⁶ Initial Results show that autocorrelation exist in the model of Pakistan, India & Sri Lanka. Cochrane Orcutt (1949). iterative procedure has been used to remove autocorrelation in these models.

¹⁷ Fayissa and Nsiah (2010), Faini (2006), Ahmed et al. (2011) and Azam and Khan (2011).

past results of Pakistan¹⁸ and other studies.¹⁹ The possible reason for this negative relationship might be the luxurious consumption spending on imported items. Consequently the decline in demand for domestically produced goods and domestic investment that retard the economic growth. Another possible reason of negative relationship between workers' remittances and economic growth might be the "brain drain" problem. The highly skilled workers when leave the country that will not only cause a shortage of human capital but also transfer their financial capital from the country, which limit domestic resource mobilization.

<Insert table 4.3 here>

Augmented Dickey Fuller (*ADF*) and Phillips Perron (*PP*) tests are used to analyze the unit root test for stationary of residuals. Results of table 4.3 show that residuals of all countries are stationary at level and variables are at first difference. This confirms the valid long run relationship exist between the considered variables in South Asian countries.

<Insert table 4.4 here>

Johansen and Jeuselius (1990) cointegration method is used to estimate the long run relationship between the variables. Table 4.4 represents the calculated and critical values of Trace statistics and Maximum Eigen value statistics. Results indicate the rejection of null hypothesis of no cointegration at significance level of 5 percent in all five countries in favor of alternative hypothesis that is one or more cointegration vectors. Both residual stationary test and cointegration test confirms the existence of long run relationship among variables of equation 3.2 of all countries.²⁰

¹⁸ Waheed and Aleem (2008).

¹⁹ Chami et al. (2003) and Karagoz (2009).

²⁰ To check the short run relationship we employed error correction model but the result were insignificant for all selected South Asian countries.

5. Causality Analysis

Granger (1969) causality test is use to analyze the direction of causality between workers' remittances and economic growth. Jones (1989) favors the ad hoc selection method for lag selection criteria in Granger causality test over some of other statistical method to determine optimal lag. In this study we use 1 lag for all models.

<Insert table 5.1 here>

Table 5.1 represents the results of granger causality test. Results show the bidirectional causality among workers' remittances and economic growth in Sri Lanka and Nepal. However, unidirectional causality exists, runs from workers' remittances to economic growth in Pakistan India and Bangladesh.

6. Sensitivity Analysis

The degree of confidence among the relationship between dependent and independent variables is tested through sensitivity analysis. (Leven and Renelt (1992)) If the coefficient of independent variable gives same sign and significance after putting additional in the basic model then they refer that the results are robust. The results are refer to fragile if coefficient of independent variables does not give same sign or significance or both after putting additional variable in basic model.

The results of sensitivity analysis are reported in table 6.1, where we have shown the impact of remittances on economic growth with the inclusion of different relevant variables in the basic model. Waheed and Aleem (2008) use foreign direct investment and education expenditure, Jawaid and Waheed (2011) use life expectancy, export as percentage of GDP and fertility rate as other determinant of economic growth in their sensitivity analysis. In our core model foreign direct investment (*FDI*), education expenditure (*EEX*), life expectancy (*LEX*), export as

percentage of GDP (*EXP*) and fertility rate (*FER*) are considered as other determinants of economic growth.

<Inset table 6.1 here>

It is confirmed from table 6.1 that the coefficient of focus variable (*R*) remains same sign and significance, despite inclusion of relevant variables in basic model. Consequently it can be concluded that the relationship between remittances and economic growth in South Asian countries are robust.

7. Conclusion and Policy Recommendations

This study investigates the effect of workers' remittances on economic growth of five South Asian countries namely Pakistan, India, Bangladesh, Sri Lanka & Nepal by employing long time series data from 1975 to 2009. Cointegration results confirm that there exist significant positive long run relationship between remittances and economic growth in India, Bangladesh, Sri Lanka and Nepal while, significant negative relationship exist between remittances and economic growth in Pakistan. Causality analysis confirms bidirectional causality between remittances and economic growth in Nepal and Sri Lanka. On the other hand, unidirectional causality exists, runs from remittances to economic growth in Pakistan, India and Bangladesh. Sensitivity analysis confirms that the results are robust. It suggested that policy makers should make policies to reduce the transaction cost to welcome remittances in south Asian countries. In addition, countries especially Pakistan should more relying on increasing exports rather than workers' remittances as foreign exchange earnings for sustainable and long run growth in the country.

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Table 4.1: Stationary Test Results

Country	Variables	ADF test				PP test			
		I(0)		I(1)		I(0)		I(1)	
		C	C&T	C	C&T	C	C&T	C	C&T
Pakistan	Y	-2.55	-2.40	-3.95	-4.34	-2.34	-2.38	-3.92	-4.34
	L	1.18	-1.09	-5.01	-5.35	1.32	-1.09	-5.01	-5.38
	K	-1.96	-3.15	-3.43	-3.43	-1.42	-2.03	-3.01	-3.49
	R	0.16	-0.46	-4.13	-4.46	-0.07	-0.61	-4.13	-4.39
India	Y	-1.69	-0.48	-3.97	-4.94	-1.37	-0.42	-3.97	-4.94
	L	-2.46	-1.39	-3.78	-4.12	-2.31	-1.02	-3.83	-4.26
	K	1.89	-1.91	-4.31	-4.79	1.89	-1.24	-4.31	-4.79
	R	1.62	-1.85	-6.28	-7.18	1.49	-2.43	-6.16	-7.13
Bangladesh	Y	2.43	-0.03	-3.95	-5.21	-1.35	-0.27	-3.95	-5.21
	L	1.99	-1.89	-4.67	-5.95	-0.45	-1.76	-4.63	-5.91
	K	0.31	-2.29	-3.53	-3.50	-0.05	-1.62	-3.56	-3.50
	R	1.65	-0.24	-4.27	-5.89	-0.03	-1.33	-4.21	-5.02
Sri Lanka	Y	-2.55	-0.14	-3.98	-4.94	-2.34	0.40	-3.98	-5.13
	L	-1.02	-2.69	-6.42	-6.45	-1.90	-2.59	-8.94	-11.88
	K	2.08	-0.57	-3.63	-4.05	2.17	-0.19	-3.60	-4.18
	R	1.46	-2.54	-5.26	-5.44	-0.33	-2.77	-5.31	-5.67
Nepal	Y	-1.00	-0.65	-2.94	-3.35	-0.45	-1.45	-3.65	-3.58
	L	0.91	-1.67	-5.32	-5.60	1.64	-1.38	-5.33	-8.66
	K	-1.34	-0.33	-2.79	-3.57	-1.34	-0.36	-5.81	-6.12
	R	0.68	-1.86	-4.91	-5.03	1.20	-1.92	-4.90	-5.42

Note: The critical values for ADF and PP tests with constant (c) and with constant & trend (C&T) 1%, 5% and 10% level of significance are -3.711, -2.981, -2.629 and -4.394, -6.612, -3.243 respectively.

Source: Author's estimations.

Table 4.2: Long Run Determinants of Economic Growth

Variables	Pakistan			India			Bangladesh			Sri Lanka			Nepal		
	Coeff.	t-stats	Prob.	Coeff.	t-stats	Prob.	Coeff.	t-stats	Prob.	Coeff.	t-stats	Prob.	Coeff.	t-stats	Prob.
C	-0.432	-5.150	0.000	-1.494	-4.114	0.000	2.200	10.759	0.000	2.404	4.631	0.000	2.668	9.869	0.000
L	1.125	15.809	0.000	1.072	9.051	0.000	0.019	2.873	0.008	0.843	1.943	0.066	0.738	2.121	0.043
K	0.321	5.160	0.000	0.429	11.909	0.000	0.219	2.172	0.040	0.037	1.756	0.094	0.705	19.104	0.000
R	-0.043	-3.186	0.004	0.033	2.394	0.025	0.056	1.984	0.059	0.408	4.983	0.000	0.049	1.744	0.093
Adj. R²	0.989			0.998			0.998			0.981			0.997		
D.W	1.710			1.583			1.641			1.362			1.537		
F-stats(prob)	878.283(0.000)			5008.818(0.000)			4582.622(0.000)			424.011(0.000)			4692.101(0.000)		

Source: Authors' estimation

Table 4.3: Unit root test for Residuals

Country	Test	Without Trend	With Trend
Pakistan	ADF Test	-3.728	-3.678
	PP Test	-3.632	-3.646
India	ADF Test	-2.923	-3.602
	PP Test	-3.046	-3.452
Bangladesh	ADF Test	-4.242	-4.203
	PP Test	-4.253	-4.213
Sri Lanka	ADF Test	-3.361	-3.320
	PP Test	-3.361	-3.320
Nepal	ADF Test	-4.799	-4.762
	PP Test	-4.815	-4.761

Note: The critical values for ADF and PP tests with constant (c) and with constant & trend (C&T) 1%, 5% and 10% level of significance are -3.711, -2.981, -2.629 and -4.394, -6.612, -3.243 respectively.

Source: Authors' estimation.

Table 4.4: Cointegration test results

Country	Null Hypothesis No. of CS(s)	Trace Statistics	5% critical values	Max. Eigen Value Statistics	5% critical values
Pakistan	None *	71.783	63.876	32.490	32.118
	At most 1	39.293	42.915	15.539	25.823
	At most 2	23.754	25.872	14.140	19.387
India	None *	58.400	40.175	38.848	24.159
	At most 1	19.552	24.276	9.327	17.797
	At most 2	10.225	12.321	6.653	11.225
Bangla desh	None *	48.481	40.175	28.614	24.159
	At most 1	19.867	24.276	13.294	17.797
	At most 2	6.573	12.321	5.578	11.225
Sri Lanka	None *	56.174	40.175	36.339	24.159
	At most 1	19.835	24.276	14.328	17.797
	At most 2	5.507	12.321	4.654	11.225
Nepal	None *	86.290	63.876	32.490	32.118
	At most 1	41.488	42.915	15.539	25.823
	At most 2	19.696	25.872	14.140	19.387

Source: Authors' estimation.

Table 5.1 Results of Granger Causality Test

Country	Variables	F-Statistic	Prob.
Pakistan	REM does not Granger Cause RGDP	5.562	0.026
	RGDP does not Granger Cause REM	2.066	0.163
India	REM does not Granger Cause RGDP	10.453	0.003
	RGDP does not Granger Cause REM	1.381	0.251
Bangladesh	REM does not Granger Cause RGDP	3.078	0.091
	RGDP does not Granger Cause REM	0.076	0.785
Sri Lanka	REM does not Granger Cause RGDP	3.786	0.063
	RGDP does not Granger Cause REM	7.956	0.009
Nepal	REM does not Granger Cause RGDP	5.967	0.021
	RGDP does not Granger Cause REM	4.012	0.055

Note: The lag length is 1 for all models.

Source: Authors' estimations.

Table 6.1: Results of Sensitivity Analysis

Variables	Pakistan					India					Bangladesh					Sri Lanka					Nepal				
	Coeff. of R	t-stats. (prob.)	Adj R ²	D.W	F-stats (prob.)	Coeff. of R	t-stats. (prob.)	Adj R ²	D.W	F-stats (prob.)	Coeff. of R	t-stats. (prob.)	Adj R ²	D.W	F-stats (prob.)	Coeff. of R	t-stats. (prob.)	Adj R ²	D.W	F-stats (prob.)	Coeff. of R	t-stats. (prob.)	Adj R ²	D.W	F-stats (prob.)
Basic Model	-0.043	-3.186 (0.004)	0.989	1.710	878.283 (0.000)	0.033	2.393 (0.025)	0.998	1.580	5008.818 (0.000)	0.055	1.983 (0.058)	0.998	1.641	4582.622 (0.000)	0.408	4.983 (0.000)	0.981	1.362	424.0117 (0.000)	0.049	1.743 (0.092)	0.998	1.537	4692.101 (0.000)
Model 1 FDI	-0.032	-2.098 (0.046)	0.989	2.011	684.165 (0.000)	0.036	2.593 (0.016)	0.998	1.516	3798.287 (0.000)	0.055	1.917 (0.067)	0.998	1.700	3557.217 (0.000)	0.440	5.781 (0.000)	0.984	1.810	380.351 (0.000)	0.051	1.767 (0.088)	0.998	1.537	3412.105 (0.000)
Model 2 FEX	-0.043	-2.619 (0.015)	0.989	1.707	632.571 (0.000)	0.034	2.364 (0.000)	0.998	1.603	3620.441 (0.000)	0.059	2.109 (0.046)	0.998	1.584	3712.401 (0.000)	0.404	4.547 (0.000)	0.981	1.351	303.212 (0.000)	0.049	1.989 (0.057)	0.998	2.305	4527.073 (0.000)
Model 3 LEX	-0.054	-1.904 (0.068)	0.987	1.679	943.966 (0.000)	0.034	2.424 (0.023)	0.998	1.530	3662.532 (0.000)	0.059	2.044 (0.052)	0.998	1.645	3549.573 (0.000)	0.412	5.828 (0.000)	0.986	1.440	429.764 (0.000)	0.067	1.7695 (0.088)	0.997	1.686	3456.235 (0.000)
Model 4 EXP	-0.034	-1.976 (0.059)	0.989	1.564	649.496 (0.000)	0.036	2.366 (0.026)	0.998	1.629	3646.643 (0.000)	0.053	1.890 (0.071)	0.998	1.659	3659.276 (0.000)	0.433	5.112 (0.000)	0.981	1.441	321.087 (0.000)	0.049	1.787 (0.027)	0.998	1.612	3456.235 (0.000)
Model 5 FER	-0.040	-3.053 (0.005)	0.990	1.855	701.844 (0.000)	0.038	2.571 (0.016)	0.998	1.627	3742.575 (0.000)	0.056	1.933 (0.065)	0.998	1.643	3514.047 (0.000)	0.470	4.678 (0.000)	0.981	1.439	322.595 (0.000)	0.049	1.568 (0.031)	0.998	1.536	3388.740 (0.000)

Source: Authors' estimation